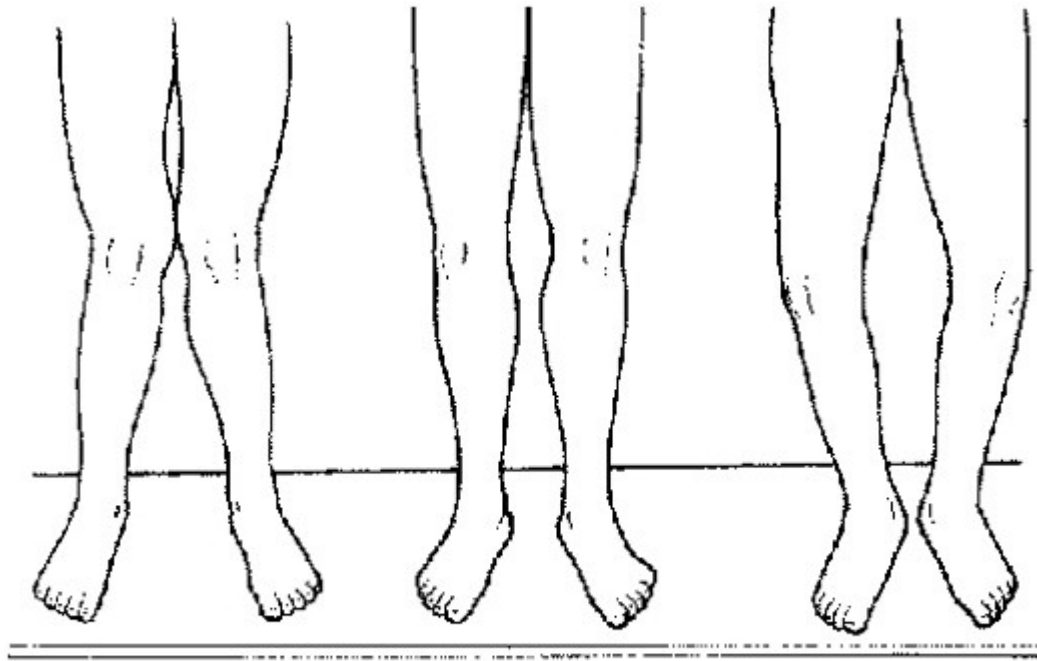


Knock Kneed Children

1. General Presentation

Genu valgum or knocked knee is a condition in which the lower legs are positioned at an outward angle when the knees are touching. Conversely, genu varum or bowlegs is a condition in which the knees remain wide apart when a person stands with the feet and ankles together.



Genu valgum

Normal

Genu varum

Figure 1. Knee alignment can be categorized as genu valgum (knock-knee), normal or genu varum (bow legged)⁵

Many infants have bilateral symmetric bowing of the legs (genu varum), which may persist in the first 1-2 years of walking before developing into an exaggerated knock-kneed condition. This transition from genu varum to genu valgus may be caused by the widening pelvis. The knock-knee is most dramatic at 3-6 years of age when it is known as *physiologic genu valgum*. At this time, the anatomic angle may be as high as 15 degree of valgus (a deformity in which an anatomical part is turned outward away from the midline of the body to an abnormal degree). Under normal development, the genu valgum then gradually remodels spontaneously to the adult average of 5-7 degrees of the valgus. By puberty, most children can stand with knees and ankles touching (without forcing the position).

2. Questions to Ask

History

Table 1 includes important aspects of the history to obtain when evaluating a child with a lower extremity problem.

Table 1. History taking in Child with Lower Extremity Problems.

Chief complaint	Know exactly what concerns the parents in order to provide prognostic information and discussion of natural history.
Complete medical history	Include maternal pregnancy, birth, and development. Questioning perinatal events and motor development may reveal a diagnosis of cerebral palsy.
Duration of complaint and progression	History should clarify if the problem began at birth, or before or after walking. How has the problem changed during the past few months?
Family history	Lower extremity abnormalities frequently demonstrate a familial tendency. Knowing the parents' experience and attitudes toward similar problems may help with the discussion later.
Why the concern?	Know why the child is in your office or clinic. Is it gait or cosmesis? A toddler's gait and legs are different from those of an adult. Parental concern often stems from a lack of understanding regarding the maturation of the gait.
Signs and symptoms	Ask about pain, limping, tripping, and falling.
Sitting habits	Internal tibial torsion is commonly associated with sitting on the feet, while increased femoral anteversion is associated with sitting in a "W" position.
Aggravating factors	Torsional deformities become more apparent with fatigue.

Differential Diagnosis for Genu Valgum

- Hypophosphatemic rickets
- Previous metaphyseal fracture of the proximal tibia
- Multiple epiphyseal dysplasia
- Pseudoachondroplasia

3. Procedure for Investigation and Treatment

The most common reason for knocked knees in children is physiologic or a normal developmental variation. Management is by serial measurement of *intercondylar* (width between the knees when feet are placed as together as possible) and *intermalleolar* (the width between ankles when the child's knee are placed together) distance to document gradual spontaneous resolution. If physiologic genu valgum persists beyond 7-8 years of age, orthopaedic referral is indicated

Unilateral deformity, progressive deformity, or lack of spontaneous resolution should alert the physician of the possibility of a pathologic deformity. Guidelines for obtaining radiographs include:

1. Genu valgum that is beyond two standard deviations for the child's age
2. Height less than 25th percentile
3. Genu valgus that has been increasing in severity
4. Asymmetry of limb alignment.

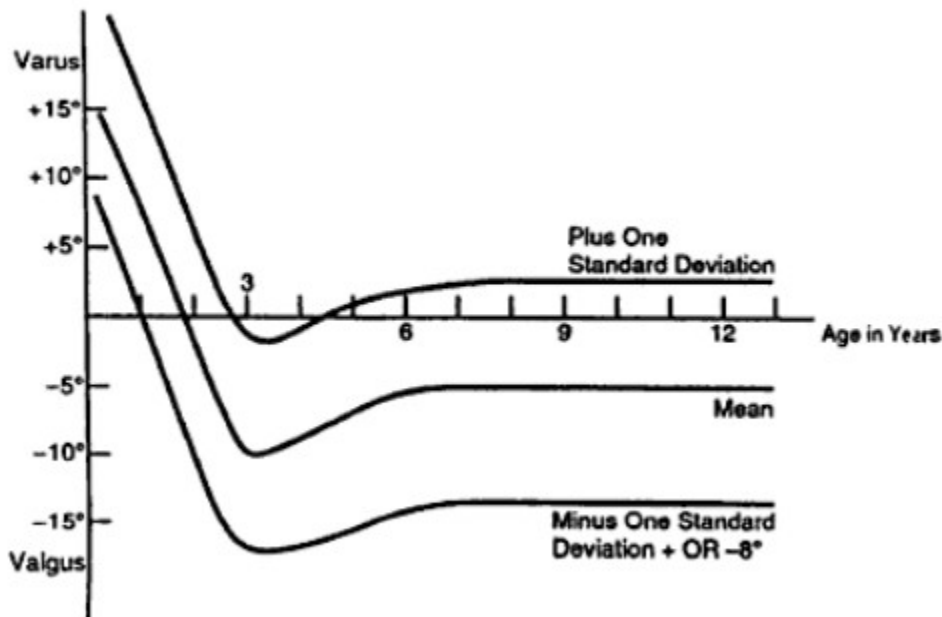


Figure 2. The tibiofemoral angle in children as depicted by the Salenius curve. All normal children go through this normal progression. Children at extremes of the curve may have abnormal appearance during the peak periods of normal development.³

Treatment

For persistent genu valgum, treatment recommendations have included a wide array of options, ranging from lifestyle restriction and nonsteroidal anti-inflammatory drugs to bracing, exercise programs, and physical therapy. In difficult to manage cases, surgery may be advised. No consensus exists regarding the optimal treatment. Some surgeons focus on the patella itself, favouring arthroscopic or open realignment techniques. However, if valgus and

malalignment of the extremity is significant, corrective osteotomy or, in the skeletally immature patient, hemiepiphysiodesis may be indicated.

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